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EXAMINER

QUAN, ELIZABETH S

| ART UNIT | PAPER NUMBER |
|----------|--------------|
| | 1743 |

DATE MAILED: 02/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|-----------------------------------|-------------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/628,470 | WEBB, PETER G. | |
| | Examiner Elizabeth Quan | Art Unit 1743 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 25 October 2003.
 2a) This action is FINAL. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1,2 and 4-36 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) Claim(s) _____ is/are allowed.
 6) Claim(s) 1,2 and 4-36 is/are rejected.
 7) Claim(s) 7 is/are objected to.
 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claim 7 is objected to because of the following informalities: “the first group” in the second line should be “a first group”. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 2, 4, 6-8, 14, 16-20, 27-29, 34, 35 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,203,140 to Oyen.

Regarding claims 1, 2, 4, 6-8, 14, 16-20, 27-29, 34, 35, Oyen discloses a method of fabricating a chemical array using a head system, transport system (14,18,20), and processor (figs. 1-4). The head system has multiple groups of drop dispensers (22), which move in unison (fig. 1; col. 3, lines 17-22). Each group comprises a series of drop dispensers including at least a first and second drop dispenser (figs. 1-4). The series of dispensers within a group communicate with a corresponding common reservoir for that series (fig. 1; col. 3, lines 34-36). The transport system moves the head system with respect to a substrate (12) with different dispensers in the series of each group following respective paths (figs. 1-4). The processor dispenses droplets

from dispensers in a pattern along a selected path for each group during operation of the transportation system to form the array (figs. 1-4; col. 3, lines 23-60).

The method includes identifying an error in the first drop dispenser of a group and moving the group of dispenser to dispense droplets from the second drop dispenser of the group along at least part of the path selected for the group (figs. 1-4; col. 3, line 61-col. 4, line 37). According to Merriam-Webster Collegiate Dictionary, a path is defined as a course or route, and route is defined as a line of travel. The selected path is considered to be the line of travel between the start and end of dispensing, such that dispensing along the same line in one direction and dispensing along the same line in the reverse direction is the same path. For instance, when dispenser (22') of eight dispensers becomes inoperative and fails to print a line, another dispenser (22'') prints the entire line in the reverse direction but in the same path simultaneously with the other seven dispensers (figs. 1-4; col. 3, line 61-col. 4, line 8). Conversely, if dispenser (22'') was inoperative, its task would be fulfilled in advanced by dispenser (22') (col. 4, lines 9 and 10). The remaining three groups of dispensers of the series, which are respectively separated by a distance of four lines, form partners, which can mutually substitute their functions (col. 4, lines 10-13). Another dispenser of another pair group may be inoperative (col. 2, lines 39-46). According to Merriam-Webster Collegiate Dictionary, alternate is defined as arranged first on one side and then on the other at different levels or points along an axial line or arranged one above or alongside the other. Whether one or two dispensers are inoperative, the first and second dispensers of each group alternately moves on different sides of each other during forward and reverse passes along the selected path for that group while droplets are dispensed from non-error dispensers of the first and second groups in at least part of the pattern for the selected path,

specifically different parts of the pattern for the selected path for the first group (figs. 1-4). Since the four groups dispense simultaneously, whether one dispenser is inoperative or two dispensers of different groups are inoperative, the second dispenser of all the groups and operative first dispensers dispenses droplets in at least part of the pattern for the selected path of the group containing the series.

Note: Claims 14, 16, 18, 19, 34 recite “when the error indication is identified” or “when an error in the first drop dispenser of a series is detected” or “if an error is detected in a first dispenser while it is dispensing a path of droplets” as if there is a possibility that no identification or detection of error is made. In such a case, the limitations following the latter recitation and dependent limitations attempting to limit these limitations are not positively recited. Examiner is entitled to a reasonably broad interpretation of the claims in which there is no identification or detection of error, such that the limitations following thereafter need not be taught or suggested by prior art. Prior art meets the claims if it fulfills all other limitations. Applicant is advised to positively recite the limitations.

Note: Regarding claim 20, the limitation of “when a dispenser of a second group is additionally identified as being in error” leaves open the possibility that the dispenser of a second group is not in error. In such a case, the limitations following the latter recitation and dependent limitations attempting to limit these limitations are not positively recited. Examiner is entitled to a reasonably broad interpretation of the claims in which a dispenser of a second group is not in error, such that the limitations following thereafter need not be taught or suggested by prior art. Prior art meets the claims if it fulfills all other limitations. Applicant is advised to positively recite the limitations.

Note: Regarding claim 34, the limitation of “if an error is detected in a first dispenser while it is dispensing a path of droplets” leaves open the possibility that no error is detected in a first dispenser while it is dispensing a path of droplets. In such a case, the limitations following the latter recitation and dependent limitations attempting to limit these limitations are not positively recited. Examiner is entitled to a reasonably broad interpretation of the claims in which there is no error detected in a first dispenser while it is dispensing a path of droplets, such that the limitations following thereafter need not be taught or suggested by prior art. Prior art meets the claims if it fulfills all other limitations. Applicant is advised to positively recite the limitations.

4. Claims 9, 11-13, 21-25 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 4,963,882 to Hickman.

Hickman discloses a method of fabricating a chemical array using a head system (10), transport system (66,70,71,72), and processor (figs. 1-13; col. 7, line 10-col. 10, line 10). The head system has multiple groups of drop dispensers which move in unison (figs. 1-13; col. 7, line 10-col. 10, line 10). Each group comprises multiple rows and columns of dispensers with at least two dispensers of the same column within a group are loaded with the same fluid (figs. 1-13; col. 2, lines 20-24 and 57-68; col. 3, lines 1 and 2; col. 7, line 10-col. 10, line 10). The groups are defined by a first row with four columns in portion (54) and second row with four columns in portion (56). A distance of three rows separates these first and second rows forming a group. The processor dispenses droplets from the dispensers during operation of the transport system in a pattern along a selected path for each group to form the array (figs. 1-13; col. 7, line 10-col. 10,

line 10). Even when an error is identified in one or more dispensers of different columns within the first and second rows of a first group, the following occur:

- (a) The head is positioned with a first row of each group aligned with the selected path for that group for printing lines, which are horizontal from the perspective of figure 4.
- (b) The head is moved with respect to the substrate while dispensing droplets from non-error dispensers in the first row of the first group in accordance with a part of the pattern for the selected path for that group (fig. 4; col. 9, lines 25-37).
- (c) The head is positioned such that a second row of each group is aligned with the selected paths. According to Merriam-Webster Collegiate Dictionary, position is defined as the act of placing or arranging, and place is defined as to put in or as if in a particular place or position. From this definition, the head may be put in the appropriate location by moving the substrate to align the specific row of nozzle with a target position on the substrate.
- (d) The head is moved with respect to the substrate while dispensing droplets from non-error dispensers in the second row of the first group in accordance with a part of the pattern for that group.

Since all the nozzles dispense simultaneously, drops are dispensed from a non-error dispenser in the same column and group as the error dispenser. The method allows the user to complete a job and replace the print head at leisure (col. 4, lines 60-63).

Note: The limitations of “when dispensers of different columns within first and second rows of a first group are in error, then” and “when an error in dispenser of different columns within first and second rows of a first group, then” leave open the possibility that the dispensers of different columns with first and second rows of a first group are not in error. In such a case,

the limitations following the latter recitation and dependent limitations attempting to limit these limitations are not positively recited. One may identify errors in claim 9 or not in claim 21, and what if the errors are not in different columns within first and second rows of a first group? Examiner is entitled to a reasonably broad interpretation of the claims in which the errors are not in dispensers of different columns within first and second rows of a first group, such that the limitations following thereafter need not be taught or suggested by prior art. Prior art meets the claims if it fulfills all other limitations. Applicant is advised to positively recite the limitations.

Note: The limitation of "when a dispenser of a second group is additionally identified as being in error" leaves open the possibility that the dispenser of a second group is not in error. In such a case, the limitations following the latter recitation and dependent limitations attempting to limit these limitations are not positively recited. Examiner is entitled to a reasonably broad interpretation of the claims in which a dispenser of a second group is not in error, such that the limitations following thereafter need not be taught or suggested by prior art. Prior art meets the claims if it fulfills all other limitations. Applicant is advised to positively recite the limitations.

5. Claims 27-29 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,354,689 to Couwenhoven et al.

Couwenhoven et al. disclose a computer program product for use with an apparatus for fabricating a chemical array having a head system (80), transport system, and processor (figs. 3, 8, 10). The head system has multiple groups of drop dispensers which move in unison (figs. 3, 8, 10; col. 5, line 57-col. 6, line 54). Each group comprises a series of drop dispensers with at least a first and second drop dispenser loaded with the same fluid in which the second dispenser dispenses along the path of the first dispenser if the first dispenser is in error (figs. 3, 8, 10; col.

5, line 57-col. 6, line 54). The transport system moves the head system with respect to a substrate with different dispenser of the series of each group following respective paths (figs. 3, 8, 10; col. 5, line 57-col. 6, line 54). The computer program product comprises a computer readable storage medium with a computer program stored thereon for performing the steps identifying an error in one or more dispensers and moving the group of dispensers to dispense droplets from the second drop dispenser of the group along at least part of the path selected for the group (figs. 1-10; col. 5, line 4-col. 6, line 54).

Note: The limitation of “when a dispenser of a second set of the first group is additionally identified as being in error” leaves open the possibility that the dispenser of a second set of the first group is not in error. In such a case, the limitations following the latter recitation and dependent limitations attempting to limit these limitations are not positively recited. Examiner is entitled to a reasonably broad interpretation of the claims in which a dispenser of a second set of the first group is not in error, such that the limitations following thereafter need not be taught or suggested by prior art. Prior art meets the claims if it fulfills all other limitations. Applicant is advised to positively recite the limitations.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Alternatively, claims 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,203,140 to Oyen.

One would expect that there is computer program product comprising a computer readable storage medium with a computer program stored thereon underlying the operation of the printer of Oyen. Regardless, it would have been obvious to one having ordinary skill in the art at the time the invention was made to include a computer program product comprising a computer readable storage medium with a computer program stored thereon to automate the operation of the dispenser for efficiency and elimination of human errors. Furthermore, it has been held that providing mechanical or automatic means to replace manual activity for

accomplishing the same result involves only routine skill in the art (*In re Venner*, 120 USPQ 192).

10. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,963,882 to Hickman in view of U.S. Patent No. 4,907,013 to Hubbard et al.

Hickman does not explicitly disclose the dispenser further comprising a sensor to monitor dispensers for an error and providing corresponding data to the processor. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the dispenser of Hickman to include a sensor to monitor dispenser for error and providing corresponding data to the processor since it is well known to automate the detection of errors in the case that a particular error may be fatal as taught by Hubbard et al.

11. Claims 5, 10, 15, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,203,140 to Oyen or U.S. Patent No. 4,963,882 to Hickman in view of U.S. Patent No. 6,001,309 to Gamble et al.

It is unclear whether the dispensers of Oyen or Hickman are pulse jets. Regardless, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide pulse jet dispensers in Oyen or Hickman to deliver small volumes in a precise manner to provide microsized droplets as taught by Gamble et al.

12. Claims 30-33, 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,203,140 to Oyen in view of U.S. Patent No. 6,284,113 to Bjornson et al. and U.S. Patent No. 6,057,100 to Heyneker or U.S. Patent No. U.S. Patent No. 6,251,601 to Bao et al.

Referring to claims 30-33, Oyen does not disclose the array comprising biopolymer, polynucleotide, or peptide components. Oyen deals with ink jet technology. However, it is well

known that ink jet technology has been adapted in the field of microfluidic devices or chemical laboratory devices in preparing arrays. Bjornson et al. disclose that developments in the microfluidic technologies have been borrowed from the ink jet printing industry, which are applicable to fulfilling at least part of the currently unmet technological needs (see COL. 3, lines 66 and 67; COL. 4, lines 1-3). The technology assists in creating combinatorial chemistry generated libraries of compounds, usually small molecules, oligonucleotides and peptides (see COL. 27, lines 8-10). Heynaker discloses that oligonucleotides may be applied to a surface in a number of ways (see COL. 7, lines 59 and 60). In a preferred embodiment, the oligonucleotides are applied using ink jet technology (see COL. 7, lines 62-64). Bao et al. disclose separated spots can be produced by ink jet methods (see COL. 9, lines 29-32). Spots may comprise of RNA, DNA, peptide nucleic acids or mixtures thereof (see COL. 7, lines 33-42; CLAIMS 18 and 28). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Oyen to construct arrays of polynucleotides or peptides in as in Bjornson et al. and Heyneker or Bao et al. since ink jet technology has been widely adapted in the field of microfluidic or chemical laboratory devices to fulfill deficiencies of microfluidic or chemical laboratory devices.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Quan whose telephone number is (571) 272-1261. The examiner can normally be reached on M-F (8:00-4:30).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Elizabeth Quan
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eq


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